REMARKS

Election/Restriction

Withdraw of the prior restriction required is duly noted, and claim 70 has been marked accordingly as no longer withdrawn.

35 U.S.C. § 112

A.   Claims 3, 8, and 12 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite.

The claims have been amended to correct any clarity issues.

B.   Claims 3, 8, 12, and 62 have been rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description.

All of the rejected claims have been reviewed and amended according to be fully supported by the original specification.

Double Patenting

A.   All pending claims (excluding claim 54) stand rejected on the grounds of nonstatutory obviousness-type double patenting over claims of US Patent 7,332,554 (Shaffer I).

Shaffer I recites an isobutylene-isoprene-isoprene triad distribution in a copolymer.

B.   Claim 54 stands provisionally rejected over claim 10 of copending Application No 11/009660 (Shaffer II) on the grounds of nonstatutory obviousness-type double patenting.

Claim 10 of Shaffer II recites an isobutylene-isoprene-isoprene triad fraction in a halogenated copolymer.

Concurrent with the filing of this Amendment, Applicants are filing terminal disclaimers over the US Patent 7,332,554 and copending Application 11/009660.

35 U.S.C. § 102(b)

All pending claims (excluding 70) stand rejected under 35 U.S.C. 102(b) over Priola (US 4107417).

Priola is cited as disclosing the manufacture of butyl rubber, specifically the polymerization of isobutylene and isoprene via the use of AlEtCl2 catalyst to produce a butyl

rubber with a viscosimetric PM of 80,000. Priola does not disclose the branching characteristics of the rubber, or of any of the examples. In the rejection, it is held that Applicants own data suggests that for compounds having a molecular weight of less than 100,000, the g' for butyl rubber polymerized in conventional methyl chloride will be in the recited range, and thus, presumably, the butyl of Priola would have a g' value in the claimed range. The burden of proof has been shifted back to Applicants to establish otherwise.

Applicants disagree with the holding regarding Priola and believes a misunderstanding/interpretation of the data disclosed within the specification has been used to support the rejection of the claims over Priola.

As disclosed in paragraph [00241] of the original specification, Example 150 was prepared by the copolymerization of isobutylene and isoprene in methyl chloride. The resulting butyl copolymer has a weight average molecular weight, Mw, of 568K with a molecular weight distribution, Mw/Mn, of 2.6; the values of g' for the Example is plotted against the Mw in Figure 5.

As well known by those skilled in the art, copolymers of the type recited by Applicant, and disclosed by Priola, are defined by a distribution of molecular weights due to varying degrees of polymerization and varying chain lengths that comprise the copolymer. A copolymer is not defined by a single molecular weight value, but is instead defined by the *weight average* molecular weight; with the molecular weight distribution, the minimum and maximum molecular weight can be roughly estimated for a single polymer sample. The current conventional technique of using size exclusion chromatography (SEC), as used by Applicant, to determine the molecular weight of a polymer is capable providing information about the polymer across the full spectrum of individual components that comprise the polymer sample. The viscosimetric method used by Priola generates only the viscosity average molecular weight Mv and does not provide further information about the polymer or its characteristics such as the molecular weight distribution information. In a typical polymer, the viscosity average molecular weight is greater than the number average, but less than the weight average molecular mass. The examiner's attention is directed to any basic textbook of polymer science, or even the Wikipedia entry for "molar mass distribution", for a more detailed discussion thereof.

As disclosed in the specification, for Example 150, the copolymer has a *weight average* molecular weight of 568 K, a number average molecular weight Mn of 217K, and a molecular weight distribution of 2.6. Given the general relationship for Mw, Mn, and Mv,

one skilled in the art would expect the Mv of the sample to be between 217K and 568K. Regarding Figure 5, each individual point on the chart is not a separate sample of a isobutylene/isoprene copolymer, but is a single component of the one sample, which, when taken collectively, has the proprieties identified in Figure 5.   Thus, while a very small component of the singular ample has a Mw less than 100,000 and a g'$_{vis.avg}$ of about 1.0, for the sample itself, the full copolymer has a Mw of 568K and a g'$_{vis.avg}$ of 0.909.

Thus, focusing on only a few data points on Figure 5 and extrapolating it out to all relatively low Mw copolymers is an incorrect use of the data.   The fact that a small component of Example 5 shows a g' value of about 1 at low molecular weights would not suggest to one skilled in the art that all similar copolymers have low molecular weights would have a g'$_{vis.avg}$ of about 1. One skilled in the art would, more than likely, expect to see the scale along the bottom x-axis of Figure 5 simply shifted to the right, reflective of the smaller molecular weights of individual components of the low molecular weight sample.

As Priola provides only viscosimetric data, one cannot make any determinations regarding the molecular weight distribution of the compound, or of the g'vis.avg of Priola's sample. Even if parsing Applicants data were determined applicable, with a Mv of 80,000, one skilled in the art would expect the Mw of Priola to be greater than 100,000, and then the g'$_{vis.}$ for the copolymer would be below the recited range.

Furthermore, using the singular data points of Figure 5 also ignores a critical element of the recited invention: the claims are directed to the g'$_{vis.\underline{avg}}$ – not individual g'$_{vis.}$ values. Thus, what is recited is the average value for all of the individual components of the sample – what is the average value of the branching for all of the different chain lengths that comprise the polymer.

Thus, for the reasons set forth above, the low Mv of Example 2 of Priola does _not_ inherently have a g'$_{vis.avg}$ value within the recited range.

It is requested that this rejection be reconsidered and withdrawn. If the examiner deems that it would useful to have a discussion with the lead inventor, Mr. Shaffer, to further understand the above, the examiner is highly encouraged to contact Applicants' attorney to arrange such a discussion.

35 U.S.C. § 103(a)

Claim 70 stands rejected under 35 U.S.C. § 103(a) as being obvious over Priola.

As argued above, Priola fails to inherently disclose the recited copolymer, and thus, also fails to render obvious the combination of the recited copolymer with a secondary rubber as recited in claim 70. It is requested that this rejection also be reconsidered and withdrawn.

The Examiner is invited to telephone the undersigned attorney if there are any issues outstanding which have not been addressed to the Examiner's satisfaction or if there are other issues which the Examiner believes can be readily resolved via a telephone interview.

Respectfully submitted,

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